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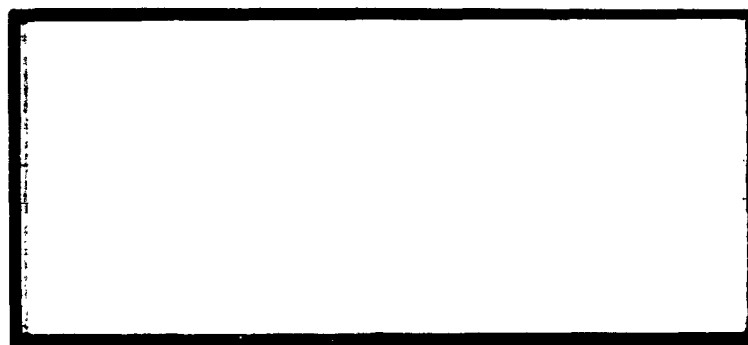
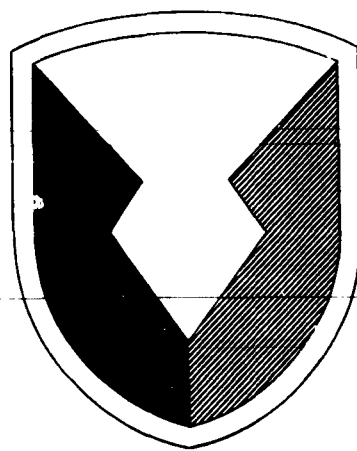


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US ARMY
ARCTIC TEST CENTER
FORT GREELY, ALASKA

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FINAL REPORT OF
SERVICE TEST OF SURVIVAL KIT,
OV-1 AIRCRAFT, COLD CLIMATE,
DA PROJECT No 1-K-1-41812-D-183-19
USATECOM PROJECT NO 4-3-1111-02-K
UNDER ARCTIC WINTER CONDITIONS
28 APRIL 1964

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HEADQUARTERS
U. S. ARMY TEST AND EVALUATION COMMAND
Aberdeen Proving Ground, Maryland 21005

AMSTE-BG

22 May 1964

SUBJECT: Final Test Report, Arctic Service Test of Survival Kit, OV-1
Aircraft, Cold Climate, USATECOM Project No. 4-3-1111-02-K

TO: Commanding General, U. S. Army Materiel Command, ATTN:
AMCRD-PM-(MO), Washington, D. C. 20315
Commanding General, U. S. Army Materiel Command, ATTN:
AMCRD-D, Washington, D. C. 20315

1. Included for your information and retention are copies of
Final Test Report, Arctic Service Test of Survival Kit, OV-1 Aircraft,
Cold Climate.

2. Analysis of the report indicates that the URC-10 radio with
battery did not operate satisfactorily below 14°F and that the plastic
water bag is not suitable for use in extreme cold climates.

3. This Headquarters concurs with the Arctic Test Center's
findings, conclusions and recommendations for subject OV-1 Survival
Kit.

FOR THE COMMANDER:

1 Incl
Test Rept
(AMCRD-PM-(MO), 5 cys)
(AMCRD-D, 3 cys)

/s/ Robert A. Bailey
/t/ ROBERT A. BAILEY
1st Lt AGC
Asst Admin Officer

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U. S. ARMY ARCTIC TEST CENTER
APO 733, Seattle, Washington

28 April 1964

FINAL REPORT OF
SERVICE TEST OF SURVIVAL KIT,
OV-1 AIRCRAFT, COLD CLIMATE,
DA PROJECT NO 1-K-1-41812-D-183-19
USATECOM PROJECT NO 4-3-1111-02-K
UNDER ARCTIC WINTER CONDITIONS

8 November 1963 - 20 February 1964

Part I - General

A. References: See Annex A, Part III.

B. Authority:

1. Directive: Letter, AMSTE-BG, USATECOM, 13 November 1963,
subject: Directive for Service Test (Arctic) of Survival Kit, OV -1
Aircraft, Cold Climate, USATECOM Project No 4-3-1111-02.

2. Purpose: To determine the suitability of the Survival Kit,
OV-1 Aircraft, Cold Climate for Army use under arctic winter conditions.

C. Description of Materiel:

1. The Survival Kit, OV-1 Aircraft, Cold Climate (test survival kit) is an individual survival kit package in a carrying case which fits into the seat bucket of the Martin-Baker Ejection Seat installed in OV-1 () aircraft. After ejection and seat separation, the seat pan and the seat bucket containing the test survival kit remain attached to the aviator by means of the lap belt. A strap, fastened to a clip, is stitched to the front of the lap belt and is known as the survival kit retention strap. This strap attaches the lap belt to the left, survival kit, vertical, restraint strap of the aviators quick fit harness, allowing the aviator, while descending in his parachute, to release the lap belt and let the survival kit hang at his side.

2. Each test survival kit is packaged in an olive drab nylon carrying case with snap fasteners on one end, and a four-foot carrying strap of 1-3/4-inch nylon webbing.

3. The components of the test survival kit are listed below:

<u>Description</u>	<u>Quantity</u>
Container Assemblies, Nylon and Metal	1
Sleeping Bag (compressed)	1
Compass	1
Hat and Mosquito Net	1
Spoon, Nonmetallic	1
Box, Matches, Waterproof	3
Food Packet, Survival, Arctic	2
Signal Flare, Day and Night	2
Knife, Pocket	1
Mirror, Signaling, Search & Rescue	1
Wire, Snare (20-feet)	1
URC-10 Radio w/Battery	1
Whistle, Plastic	1
Matches, Strike Anywhere 20/Box	
w/Waterproofing	1
Candles, Illuminating	2
Fuel, Rations Heating (Individual)	3
Bag, Water, Plastic	1

4. Two test survival kits arrived at this Center (formerly Board) 8 November 1963 minus the two URC-10 radios and one sleeping bag. A maintenance package was not provided. Natick Laboratories stated that a maintenance package was not deemed necessary, but should testing reveal that one was required, it would be prepared (paragraph O, Annex A). The missing radios and sleeping bag were received 1 February 1964.

5. The identification photographs of the test survival kit are on pages III.C.1 and C.2, Annex C.

D. Background:

1. A requirement for the test survival kit was stated in paragraph B, Annex A.

2. OV-1 () aircraft are operating in hot and cold climates, over mountains, deserts, jungles, and over large bodies of water. A requirement exists for a means of survival for each airplane occupant in the event that an airplane is forced down or abandoned in uninhabited areas. OV-1 () survival kits have been developed and tested for hot climates and over water.

3. The purpose of the Survival Kit, OV-1 Aircraft, Cold Climate, is to provide the survivors with items necessary to sustain life until rescuers arrive, and with signaling devices to attract the rescuer's attention. The test survival kit is intended to supplement an individual's clothing and equipment. Therefore, the individual must be dressed, equipped, and armed for the environments which he will encounter after a forced landing or parachute abandonment of the airplane (paragraph E, Annex A).

4. This Center service tested an Aircraft Survival Kit, Cold Climate during the 1959-1960 test season. The results of this test revealed that the survival kit would be suitable when discrepancies pertaining to compatibility with the L-19 and U-1A airplanes were corrected, and that some of the components in the first-aid kit were not suitable for use in the arctic (paragraph D, Annex A).

5. This Center evaluated the Army Aircraft Survival Kit, Cold Climate during the 1961-62 test season. The results of this test revealed that the survival kit would be suitable with the addition of an electronic location marker beacon (SARAH) and the corrections of other minor deficiencies of the components (paragraph F, G, H and I, Annex A).

6. The U. S. Army Aviation Board, Fort Rucker, Alabama, completed the evaluation of the Army Aircraft Hot Climate and Overwater Survival Kits for the OV-1 () Airplane, 29 March 1963, and recommended that they be classified Standard A for use in Army aircraft equipped with Martin-Baker ejection seats. Certain components of this kit are also common to the test survival kit (paragraph J, Annex A).

7. Survival kits were deleted from CDOG on 24 June 1963, as having been type classified.

8. Natick Laboratories recommended that testing be limited to checking the fit in the ejection seat under cold climate conditions, since the suitability of the components in the test survival kit, in a survival situation, had already been proven (paragraph K, Annex A). This Center conducted a complete service test on the survival kit.

9. Information concerning tripartite standardization was not available.

E. Test Objectives: Same as B2.

F. Findings: Tests were conducted by Major Charles V. Heath, MSC, and other personnel of Test Division 4, U. S. Army Arctic Test Center, utilizing plan of test (paragraph N, Annex A).

1. The Survival Kit, OV-1 Aircraft, Cold Climate, was tested during the period 8 November 1963 to 20 February 1964. During this period, the test survival kit was exposed to prevailing weather conditions and tested under as wide a range of ambient air temperatures as available down to -46°F. As a goal, attempts were made to obtain data and compare performance at temperatures above 0°F, at temperatures between 0°F and -25°F, between -25°F and -40°F, and below -40°F. The lengths of cold-soak periods and ambient air temperatures, during cold-soak and utilization were recorded in each test, as appropriate.

2. The test survival kit was satisfactory with respect to compatibility with related equipment, ease of operation, crew comfort and safety, and maintenance.

3. The test survival kit was unsatisfactory with respect to the following:

a. Functional Suitability:

(1) Items, deemed necessary, should be added, e.g., Survival manual, FM 21-76 and survival saw.

(2) The URC-10 radio w/battery would not operate satisfactorily on the VOICE mode after cold-soak of sixteen hours at an average ambient air temperature of 14°F and below.

(3) Test survival kit did not have a means to prevent or detect tampering with the contents of the kit (paragraph I.3, Annex B).

b. Durability and reliability, pertaining to the plastic water bag, which shattered at -38°F, rendering it useless (paragraph I, Annex A).

4. Aircraft survival kit military characteristics were drafted and approved for a survival kit consisting of one package, containing two kits for two personnel, overall size not to exceed 20x14x11 inches. The OV-1 () seat will not accommodate a kit this large. A comparison of the military characteristics (paragraph E, Annex A) and the findings of this Center are appended as Annex D. The test survival kit meets the military characteristics with the following exceptions:

a. FM 21-76, Survival, not included.

b. First aid kit not provided, however, the PSK-2, Survival Kit, Individual, was provided as a first aid supplement for the pilot to carry on his person.

c. Ointment, Sun Protective, Metal Can (Lipstick, Anti-Chap) was not included.

d. Saw-Knife-Shovel Assembly, Detachable Handle (improved model) was not included.

e. Tabs, Fire Starting were not provided.

f. Due to the decrease in available space in the OV-1 () seat, mentioned above, a lesser quantity of some of the components was provided, e.g., signal, distress day and night. The military characteristics specify four, but two were provided and deemed adequate.

5. Throughout all tests, particular attention was paid to whether applicable deficiencies and shortcomings previously reported (paragraphs I and J, Annex A), have been satisfactorily corrected.

6. The ability to operate and maintain the test survival kit without specific written instructions was evaluated throughout all testing. It was determined that the survival kit should have instructions for performing periodic visual inspections of the contents to insure completeness and serviceability of the contents, as well as a packing list (paragraph I, Annex B).

7. Throughout all phases of the test, adverse features regarding human factors engineering, relative to safety, and crew and passenger comfort were investigated and recorded. All problems discovered were reported.

8. Testing of the test survival kit revealed that a daily inspection was unnecessary, provided the radio w/battery were removed, and that an inspection every 60 days, concurrent with the required repacking of the Martin-Baker Ejection Seat, was more realistic and would still serve the same purpose. The kit, when installed, is an integral part of the ejection seat.

G. Discussion:

1. The following items were deemed necessary and were added to one of the two test kits by this Center without any difficulty:

a. Survival manual, FM 21-76.

b. Saw Assembly, Hand, Finger Grip, Survival Type MB-2, FSN 5110-570-6896.

c. Survival Uses of the Parachute, AFM 64-15, dated 1 July 1956.

d. Compass, Lensatic. On 1 February 1964, U. S. Army Natick Laboratories provided a larger compass (FSN 5210-348-5820) than the one originally provided with the test survival kit (paragraph II.2, Annex B, and photograph III.C.3).

e. Ointment, Sun Protective, Metal Can (Lipstick, Anti-Chap).

f. Fishing Kit, Survival.

g. Insect Repellant (for use during summer months).

h. Poncho.

i. Tabs, Fire Starting (four each).

2. The test survival kit should not require an inspection sooner than every 60 days, therefore, it is the opinion of this Center that the URC-10 radio with battery should not be stored in the test survival kit, but should be carried by the personnel flying in the OV-1 () aircraft. The radio should be stored in the supply room or personnel equipment section of each unit and given an operational check immediately prior to each flight by the aviation personnel concerned to insure satisfactory operation of the radio before departing on a flight. The continuous cold-soaking of the radio with battery, at low ambient air temperatures, for periods in excess of 16 hours is not desirable, since the low temperatures adversely affect its operational capability. Warm storage of the radio with battery, in addition to the body warmth received while carrying the radio on one's person, would insure the most desirable operation of the URC-10 with battery. The U. S. Air Force Personnel at Eielson AFB, Alaska store their survival radios in the Personal Equipment Section. Prior to each flight, the aviator personally checks his radio and then places it in a radio vest on his person. OV-1 () aviators assigned to USARAL carry their SARAH rescue radios in their flight suit pockets (paragraph F, Annex A).


3. The Ground/Air Emergency Code should be imprinted on the URC-10 radio to provide the downed aviator with an additional means to attract rescuer's attention.

H. Conclusions: It is concluded that:

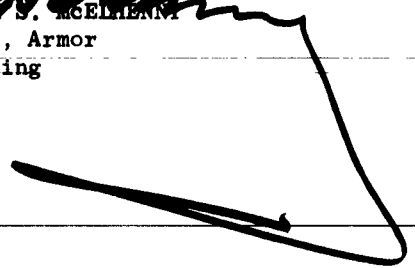
1. The Survival Kit, OV-1 Aircraft, Cold Climate should be suitable for Army use under arctic winter conditions when the deficiencies and as many of the shortcomings as practicable, listed in Annex B, are corrected.

2. Safety Confirmation: The test survival kit is considered safe for utilization at temperatures down to -46°F under the conditions encountered during this test.

I. Recommendation: It is recommended that the Survival Kit, OV-1 Aircraft, Cold Climate be considered suitable for Army use under arctic winter conditions when the deficiencies and as many of the shortcomings as practicable, listed in Annex B, are corrected.



WILLIAM S. MCELHENNY
Colonel, Armor
Commanding



Part II - Test Data

A. Test No 1 - Preoperational Inspection and Physical Characteristics:

1. PURPOSE:

a. To determine if the test survival kit was in proper condition for testing.

b. To determine the physical characteristics of the test survival kit.

2. METHOD:

a. Prior to initiation of testing, the test survival kit was inspected and placed in the best possible condition for test. Defects found were recorded.

b. The test survival kit was weighed, measured, photographed and examined for unusual characteristics. Weights and dimensions were recorded.

3. RESULTS:

a. The test survival kits were not provided with a maintenance package or any type of instructions (paragraph M, Annex A). These items were requested from Natick Laboratories, Natick, Massachusetts, 27 November 1963, and Natick Laboratories replied that if testing revealed that a maintenance package was necessary, they would provide one (paragraph O, Annex A and Paragraph I.3, Annex B).

b. Two URC-10 radios w/batteries and one sleeping bag were missing from the test survival kits, but were provided 1 February 1964 (paragraph II.1, Annex B). Blocks of wood of the approximate sizes of the missing items were substituted until this time.

c. The test survival kit's physical characteristics were as follows:

(1) Weight: 18 pounds w/radio and battery included, 16 pounds without radio and battery.

(2) Height: 4-1/2 inches.

(3) Width: 13-3/4 inches.

(4) Depth: 12 inches.

d. Photographs of the test survival kit are shown on pages III.C.1 and III.C.2, Annex C.

B. Test No 2 - Compatibility with Related Equipment:

1. **PURPOSE:** To determine if the test survival kit was compatible with the OV-1 () Martin-Baker Ejection Seat.

2. **METHOD:** The test survival kit was installed in the OV-1 () aircraft and data with respect to the following were recorded:

- a. Fit.
- b. Firmness.
- c. Interference with controls.

3. RESULTS:

a. As to the fit, each test survival kit fit as well as the empty filler provided with the seat.

b. As to the firmness, each test survival kit provided the necessary firmness, comparable to the seat without the test survival kit installed.

c. No interference with controls occurred. All controls were as readily accessible and operational to the pilot and copilot with the test survival kits installed, as with them removed from the aircraft.

d. The extra 3/4-inch thickness of the one test survival kit, with the desired additional items included, (Test No 4) did not cause interference with any of the controls.

C. Test No 3 - Ease of Operation, Crew Comfort and Safety:

1. PURPOSE:

a. To determine if the test survival kit could be readily installed.

b. To determine if the installation of the test survival kit was prejudicial to crew comfort and safety.

2. METHOD:

a. The test survival kit was installed in an OV-1C aircraft by OV-1 () qualified personnel (wearing or not wearing the Arctic Mitten Set) during various periods of low ambient air temperatures, in sheltered and unsheltered areas. The following data were recorded:

(1) Temperature at time of installation.

(2) Time to install indoors.

(3) Time to install outdoors w/o wearing the Arctic Mitten Set.

(4) Time to install outdoors wearing Arctic Mitten Set.

(5) Difficulties encountered.

b. The installation of the test survival kit was checked in every feasible manner with the exception of actual ejection. Data with respect to the following were recorded:

(1) Crew accommodation.

(2) Seat configuration.

(3) Undue or excessive crew fatigue.

(4) Comfort with and without the test survival kit installed.

(5) Difficulties encountered.

(6) Adequacy of operating instructions.

3. RESULTS:

a. Data relative to installation and removal were as follows:

<u>No of Instl</u>	<u>Temp at Time of Instl</u>	<u>Time to Instl Indoors</u>	<u>Instl Time Outdoors w/o Arctic Mittens (min)</u>	<u>Instl Time Outdoors w/Arctic Mittens (min)</u>	<u>Difficulties Encountered</u>
1	70°F	2 men- 20 min			Inexperienced personnel and trouble with sticker clips.
1	68°F	1 man- 10 min			None
1	-35°F		18	22	None
1	*-24°F		15	17	None
1	-18°F		14	15	None
2	-15°F		14	16	None

*Wind of 18 knots gusting to 25 knots.

Average removal time at all temperatures, inside and outside, with and without the Arctic Mitten Set was five minutes.

b. After 26.25 hours of flight time, 15.42 hours of which was accomplished with the test survival kits installed, the test kit was judged satisfactory by all test personnel in the following areas:

- (1) Crew accommodation.
- (2) Seat configuration.
- (3) No undue or excessive crew fatigue.
- (4) Comfort with and without the test survival kit installed.

c. Operating instructions were not provided with the test survival kit. Detailed testing revealed that operating instructions were not necessary due to the simplicity of the installation, removal and inspection, however, a packing list should be provided with each survival kit to aid in inspections.

D. Test No 4 - Functional Suitability:

1. PURPOSE: To determine if the test survival kit was functionally suitable for use under arctic winter conditions.

2. METHOD: The test survival kit was physically compared to the Kit, Survival, Army Aircraft, Cold Climate, which was arctic tested during the 1961-62 test season, to determine its adequacy for emergency survival situations of short duration, consistent with the limited space available in the seat bucket. The following data were recorded:

- a. Adequacy of components.
- b. Additional items deemed necessary.
- c. Items deemed unnecessary.
- d. Items found to be unsuitable during previous arctic testing.
- e. Items found to be unsuitable during present testing.

3. RESULTS:

a. Difficulties were encountered in the following components of the test survival kit:

(1) The plastic water bag became brittle and shattered at -38°F, during a previous arctic service test (paragraph I, Annex A). This deficiency of the previous test has not been corrected.

(2) The compass provided with the test survival kit was too small to be handled with arctic mittens and was easily lost in the snow (paragraph II.2, Annex B), (see photograph, Annex III.C.3). A larger compass (FSN 5210-348-5820) was provided by Natick Laboratories on 1 February 1964. The larger compass could be fastened to the wrist or other parts of the body to prevent loss.

(3) The URC-10 radio w/battery would not operate satisfactorily on the VOICE mode after 16 hours of cold-soak at ambient air temperatures of 14°F and below. The battery must be maintained between 40°F and 125°F for eight hours prior to flight operations. (according to printed instructions on the battery). Previous testing of this radio at this Center revealed that the radio operated satisfactorily for ten hours on the TONE mode after a 48 hour cold-soak at ambient air temperatures ranging between -35°F and -49°F. Nothing was mentioned as to the operation of the VOICE mode at these temperatures (paragraph G, Annex A).

The radios provided with the test survival kit were cold-soaked 60 hours at an average ambient air temperature of -28°F and operated satisfactorily on the TONE mode, but all VOICE transmissions were garbled and unreadable at all distances. A warm battery connected to the cold-soaked radio, and the cold-soaked battery attached to the warm radio did not improve the VOICE transmission of the radio, however, TONE transmissions remained satisfactory. At the same time, the warm radio and warm battery contacted a C-123 aircraft at 8,000 feet absolute altitude, at a distance of 50 nautical miles. On the cold-soaked radio w/battery, the same aircraft could not receive VOICE but could receive TONE. Numerous other attempts failed to produce results beyond ten miles, at altitudes to 8,000 feet on a warm or cold radio. The warm and cold batteries provided power to the URC-10 radios for approximately 28 hours before failure. The average ambient air temperature during the period of continuous operation was -11°F.

b. The following additional items were deemed necessary. Space and weight permitted their inclusion:

(1) Survival manual, FM 21-76 to help the individual, in a survival situation, to acquire and/or improve the basic soldiering skills necessary to survive. ~~FM 21-76 is a component of the Army Aircraft Survival Kit, Cold Climate, which is classified Standard A.~~

(2) Saw Assembly, Hand, Finger Grip, Survival Type, MB-2, FSN 5110-570-6896, for cutting wood necessary for shelter and heat. This saw is provided with a spare blade and one man utilizing it can cut through a 3-inch tree in one minute.

(3) Survival Uses of the Parachute, AFM 64-15 dated 1 July 1956 (a component of all Air Force survival kits). It is 3½ inches by 4 inches, approximate weight is one ounce and it is sealed in a clear plastic bag. Since the parachute is an invaluable aid to survival, it is essential that personnel in a survival situation be aware of its many uses.

(4) Lipstick, Anti-Chap and Sunburn Protective, Cold Climate, FSN 8510-161-6205 for the prevention of chapped or parched lips which occur frequently in cold climates.

(5) Fishing Kit, Survival FSN 7810-273-8596, size 4-5/8 inches by 2-13/16 inches by 1-1/8 inches and weight 6.5 ounces. This is a complete fishing kit for survival situations which would be invaluable for summer and winter survival (ice fishing). This item was recommended for inclusion in the Army Aircraft Survival Kit, Cold Climate tested during the 1961-62 test season (paragraph I, Annex A).

(6) Tabs, Fire Starting, to aid in starting fires.

(7) Poncho, FSN 8405-170-9894 to provide additional shelter and protection from the elements.

c. All items of the test survival kit were deemed necessary except the Headnet, Insect which could be removed during the winter months.

d. The Bag, Water, Plastic FSN 8465-485-3034 which became brittle during the previous arctic test by this Center was still issued with this kit and is still unsuitable.

e. The following items were found to be defective during this service test:

(1) The URC-10 radio with battery did not operate properly after 16 hours of cold-soak at -14°F. No difficulties were encountered when the radio with battery was kept warm until use, (paragraph I.1, Annex B).

(2) The test survival kit did not have a means to prevent or detect tampering with the contents of the kit (paragraph I.3, Annex B).

f. Insect Repellant, FXN 6840-823-7851, should be included during the summer months and removed prior to the winter season.

E. Test No 5 - Maintenance:

1. PURPOSE:

a. To determine whether maintenance and required inspections could be readily accomplished.

b. To accumulate data concerning man-hours used in maintenance.

2. **METHOD:** Using appropriate tools and skills, all authorized maintenance was performed on test survival kit in accordance with the applicable maintenance instructions. Organizational maintenance was accomplished outdoors, under field conditions, at low ambient air temperatures to an extent sufficient to determine whether maintenance could be performed under these conditions. During outdoor maintenance, personnel were dressed in appropriate winter clothing, to include the Arctic Mitten Set. The following data were recorded:

a. Man-hours required to perform first echelon maintenance (indoors and under field conditions).

b. Man-hours required to perform second echelon maintenance (indoors and under field conditions).

c. Total man-hours expended in maintaining the test survival kit.

d. Unduly difficult or time consuming operations.

e. Adequacy of maintenance instructions.

3. RESULTS:

a. Each inspection (first echelon) of the test survival kit required one man, five minutes both indoors and outdoors.

b. No second echelon maintenance was required.

c. A total of 1.17 man-hours were expended in maintaining the test survival kit (scheduled inspection).

d. No unduly difficult or time consuming operations were encountered.

e. Maintenance instructions were not provided. Instructions permanently affixed to the cover should be provided as a means for performing periodic visual inspections of the contents to insure completeness and serviceability of contents (paragraph I.3, Annex B).

F. Test No 6 - Durability and Reliability:

1. PURPOSE: To determine whether the test survival kit was durable and reliable.

2. METHOD:

a. The test survival kit was examined after each flight or at least once each day for the first three days of testing for damage caused by exposure to prevailing environmental conditions or through usage.

b. Upon completion of test, the test survival kit was thoroughly examined to determine to the greatest extent possible, if it satisfied the time life requirement of two years as outlined in the military characteristics. Abnormalities were recorded and reported.

3. RESULTS:

a. No difficulties were encountered with the test survival kit with respect to durability and reliability, except for the URC-10 radio w/battery, which would not transmit satisfactorily in the VOICE mode after a cold-soak at low ambient air temperatures below 14°F. The TONE mode operated satisfactorily to ambient air temperatures of -46°F (see Test No 4).

b. The test survival kit was examined after each flight for the first three days of testing with no damage being revealed. A weekly and monthly inspection also revealed no damage, after exposure to ambient air temperatures to -46°F and through 15.25 flight hours, over a period of 3½-months, while being installed in the OV-1C aircraft.

c. The test survival kits were thoroughly examined upon completion of testing. This inspection revealed no adverse effects caused by low ambient temperatures, however this Center is unable to determine if the test survival kit satisfies the two year time life requirement as outlined in the military characteristics other than for the period and conditions of the test, (except for the radio batteries whose time life will vary with temperature and usage) No abnormalities were found.

Part III - Annexes

ANNEX A

REFERENCES

- A. RDT&E No: 1-K-1-41812-D-183-19. RDB Technical Objective No; Unknown.
- B. CDOG, Paragraph 533e(6) deleted 24 June 1963.
- C. Reports of Equipments Failures No 1 through 5, USATECOM Project No 4-3-1111-02-K, "Service Test of the Survival Kit, Ov-1 Aircraft, Cold Climate," U.S. Army Arctic Test Board.
- D. Report of Test, Project No ATB 4-10, U. S. Army Arctic Test Board, 11 May 1960, Service Test of Kit, Survival, Individual, Cold Climate, Army Aircraft.
- E. Letter, ATDEV-6 452, Headquarters USCONARC, 1 March 1961, subject: USCONARC Approved Military Characteristics for Survival Kits, Army Aircraft.
- F. Technical Report, Alaskan Air Command, Arctic Aeromedical Laboratory, May 1961, An Evaluation of an Electronic Location Marker (SARAH) for Arctic use.
- G. Report of Project No ATB 4-141, Service Test of AN/URC-10 Personal Rescue Radio, 9 May 1961.
- H. Letter, U. S. Army Arctic Test Board, 25 October 1961, subject: Recommendation for Test of Rescue Locator Beacon.
- I. Report of Test of Project No ATB 4-92, Evaluation of Army Aircraft Survival Kit, Cold Climate, 20 March 1962.
- J. Report of Test, U. S. Army Aviation Board of USATECOM Project No 4K-3600-01, Evaluation of Army Aircraft Hot Climate and Overwater Survival Kits for the OV-1 () Airplane, 29 March 1963.
- K. Letter, AMXRE-APM, Headquarters, Quartermaster Research and Engineering Command, Natick, Massachusetts, 18 October 1963, subject: Service Test (Arctic) of Survival Kit, OV-1 Aircraft, Cold Climate.
- L. Letter, Headquarters, USATECOM, 13 November 1963, subject: "Directive, for Service Test (Arctic) of Survival Kit, OV-1 Aircraft, Cold Climate, USATECOM Project No 4-3-1111-02".

M. Message 3296, AMXRE-APM, Natick Laboratories, Natick, Massachusetts, 20 November 1963.

N. Plan of Test of USATECOM Project No 4-3-1111-02, Service Test of the OV-1 () Aircraft Survival Kit, Cold Climate, under Arctic Winter Conditions, U. S. Army Arctic Test Board, 20 November 1963.

O. Letter, AMXRE-APM, U. S. Army Natick Laboratories, 9 January 1964, subject: Arctic Service Test of OV-1 () Aircraft Survival Kit, Cold Climate, USATECOM Project No 4-3-1111-02.

ANNEX B

LIST OF EQUIPMENT FAILURES

PART A

DEFICIENCIES/SHORTCOMINGS - PREVIOUS TEST

(Survival Kit, Aircraft, Cold Climate, paragraph I, Annex A)

- A.1 Plastic water bag became brittle and shattered at 38°F.
- A.2 The tape holding the sleeping bag container tore loose without separating the container.
- A.3 The sleeping bag tie string could not be fastened to remain tight about the head and shoulders.
- A.4 Ring on Signal, Distress, Day and Night pulled loose without ignition.
- A.5 Wing nut on saw handle too small and loose washer became lost.

FINDINGS THIS TEST

- Not corrected
- Not corrected
- Not corrected
- Not corrected
- Saw not provided with this kit.

PART B

SECTION 1

This section contains deficiencies requiring elimination in order to make the item acceptable for use on a minimum basis.

DEFICIENCY

SUGGESTED CORRECTIVE ACTION

REMARKS

I.1 The URC-10 radio w/battery would not transmit satisfactorily on the VOICE mode after a cold-soak of 16 hours at ambient air temperatures of 14°F or below.

The URC-10 radio w/battery be removed from the survival kit and placed in warm storage until immediately prior to use, then carried on the aviator's person.

Test No 4, Report of Equipment Failure No 3.

I.2 The survival kit did not contain the following items in accordance with the applicable military characteristics:

Missing items be included in the kit, since space and weight are available.

Test No 4, Report of Equipment Failure No. 4.

a. Survival manual FM 21-76.

b. Saw, Survival.

c. Ointment, Sun Protective, Metal Can.

d. Tabs, Fire Starting

I.3 The survival kit failed to meet the military characteristics as follows:

a. "Have a means to prevent and detect tampering with contents of the kit."
a. Provide a means to seal the kit e.g., zippered bag with lead seal.

a. Test No 4, Report of Equipment Failure No 5.

III.B.2

<u>DEFICIENCY</u>	<u>SUGGESTED CORRECTIVE ACTION</u>	<u>REMARKS</u>
b. "Instructions should be provided as a means for performing periodic visual inspections of the contents to insure completeness and serviceability of the contents."	b. Provide instructions and a packing l.st, imprinted on one of the containers.	b. Test No 5, Report of Equipment Failure No 5.

SECTION II

This section lists those deficiencies and shortcomings in the item which were discovered during test and satisfactorily corrected prior to completion of the test. They no longer represent a defect in the item tested. The correction must be applied to the production model of this item.

<u>DEFICIENCY/SHORTCOMING</u>	<u>CORRECTIVE ACTION</u>	<u>REMARKS</u>
II.1 Two test survival kits arrived at this Center minus two URC-10 radios w/batteries and one sleeping bag.	Missing items provided 1 February 1964.	Test No 1, Report of Equipment Failure No 1.
II.2 The compass provided with the test survival kit is too small for utilization by personnel wearing the Arctic Mitten Set and was easily lost in the snow.	Larger compass provided.	Test No 4, Report of Equipment Failure No 2.

III.B.3

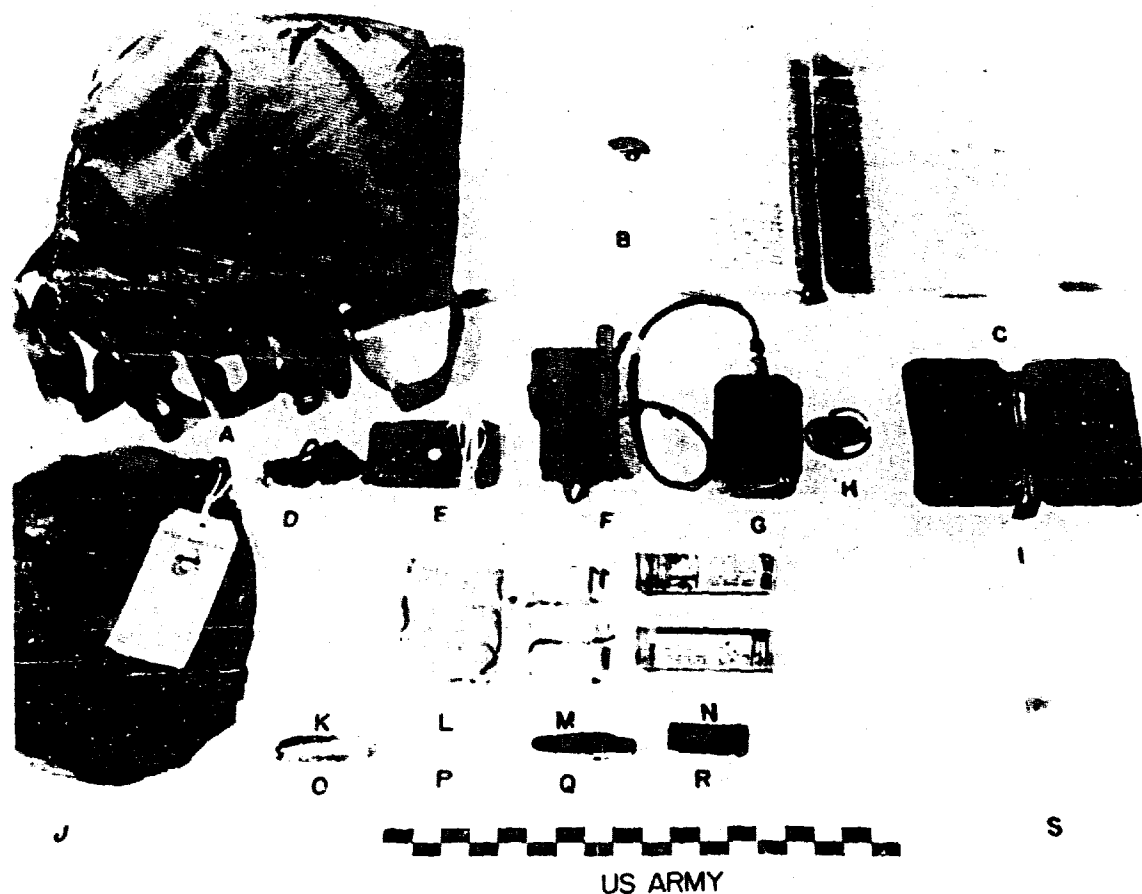
SECTION III

This section contains shortcomings which should be corrected, if it can be done without unduly complicating the item or inducing another undesirable characteristic, either concurrent with elimination of the deficiencies in Section I, or in production engineering, or by product improvement.

SHORTCOMING

	<u>SUGGESTED CORRECTIVE ACTION</u>	<u>REMARKS</u>
III.1 Additional items deemed necessary for inclosure into the survival kit:	Include items in survival kit. Item "e" be imprinted on URC-10 radio..	Test No 4, Report of Equipment Failure No 5.
a. Survival Use of Parachute AFM 64-15.		
b. Fishing Kit, Survival		
c. Poncho		
d. Packing list of components w/inspection requirements.		
e. Ground/Air Emergency Code.		

III.B.4



U. S. ARMY ARCTIC TEST CENTER
FORT GREELY, ALASKA

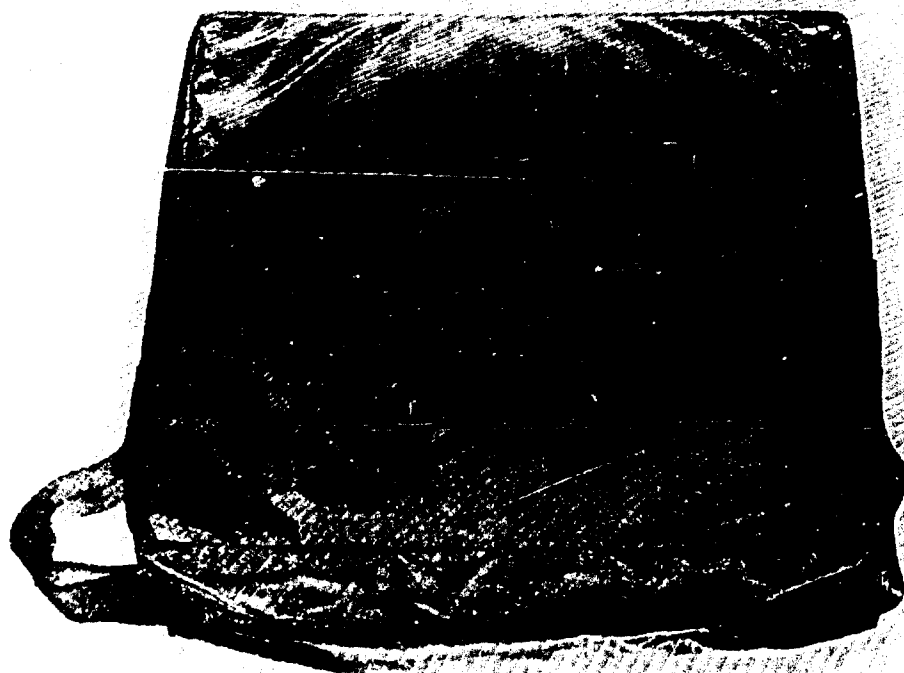
PROJECT NO 4-3-1111-02-K

3 FEBRUARY 1964

NEGATIVE NO 1074-1

SERVICE TEST OF SURVIVAL KIT, OV-1 AIRCRAFT, COLD CLIMATE

- | | |
|----------------------------------|------------------------------------|
| A. CONTAINER ASSEMBLY, NYLON | K. CANDLES, ILLUMINATING |
| B. SLEEPING BAG | L. FUEL, RATIONS HEATING |
| C. CONTAINER ASSEMBLY, METAL | M. BOX, MATCHES WATERPROOF |
| D. WHISTLE, PLASTIC | N. SIGNAL FLARE, DAY AND NIGHT |
| E. MIRROR, SIGNALING | O. WIRE, SNARE (20-FEET) |
| F. URC-10 RADIO | P. SPOON, NONMETALLIC |
| G. BATTERY, RADIO | Q. KNIFE, POCKET |
| H. COMPASS (LARGER TYPE) | R. MATCHES, STRIKE ANYWHERE 20/BOX |
| I. FOOD PACKET, SURVIVAL, ARCTIC | W/WATERPROOFING |
| J. NET & MOSQUITO NET | S. BAG, WATER, PLASTIC |



US ARMY

U. S. ARMY ARCTIC TEST CENTER
FORT GREELY, ALASKA

PROJECT NO 4-3-1111-02-K

22 NOVEMBER 1964

NEGATIVE NO 711-2

SERVICE TEST OF SURVIVAL KIT, OV-1 AIRCRAFT, COLD CLIMATE

SURVIVAL KIT, OV-1 AIRCRAFT, COLD CLIMATE IN NYLON CARRYING CASE

III.C.2



US ARMY

U. S. ARMY ARCTIC TEST CENTER
FORT GREELY, ALASKA

PROJECT NO 4-3-1111-02-K

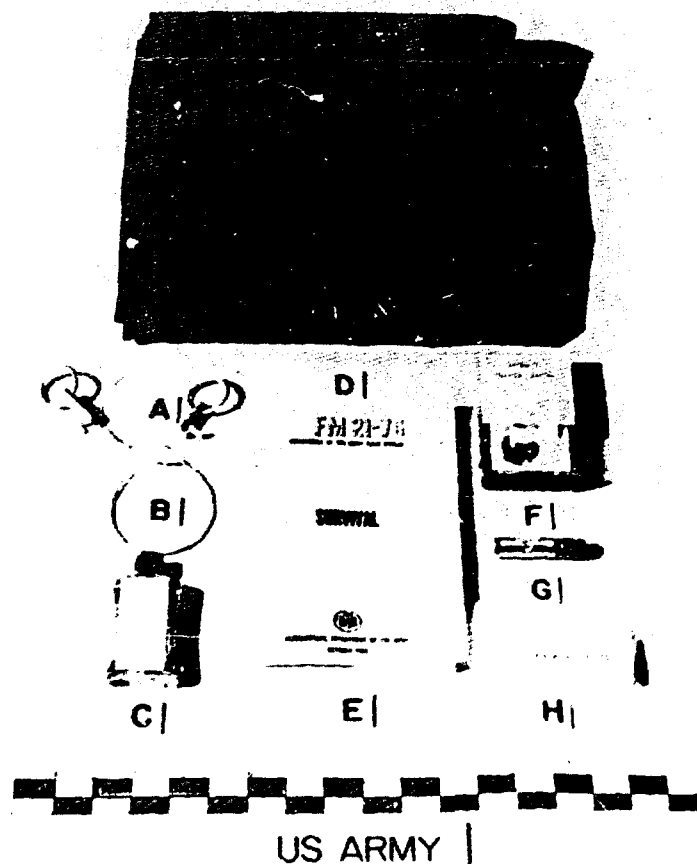
3 FEBRUARY 1964

NEGATIVE NO 1074-2

SERVICE TEST OF SURVIVAL KIT, OV-1 AIRCRAFT, COLD CLIMATE

- A. COMPASS ORIGINALLY PROVIDED WITH THE TEST SURVIVAL KIT
- B. LARGER COMPASS LATER PROVIDED FOR INCLUSION INTO THE TEST SURVIVAL KIT

III.C.3



U. S. ARMY ARCTIC TEST CENTER
FORT GREELY, ALASKA

U. S. ARMY ARCTIC TEST CENTER
FORT GREELY, ALASKA

PROJECT NO 4-3-1111-02-K

3 FEBRUARY 1964

NEGATIVE NC 1074-3

SERVICE TEST OF SURVIVAL KIT, OV-1 AIRCRAFT, COLD CLIMATE

ITEMS RECOMMENDED FOR INCLUSION INTO THE TEST SURVIVAL KIT:

- | | |
|-------------------------------|------------------------------------|
| A. SAW, SURVIVAL | F. FISHING KIT, SURVIVAL |
| B. SAW, SURVIVAL, SPARE BLADE | G. LIPSTICK, ANTI-CHAP |
| C. REPELLANT, INSECT | H. SURVIVAL USES OF THE PARACHUTE |
| D. PONCHO | AFM 64-15 |
| E. FM 21-76 SURVIVAL MANUAL | I. TABS, FIRE STARTING (NOT SHOWN) |

ANNEX D

Comparison of Military Characteristics with Findings this Service Test

* MILITARY CHARACTERISTICS

FINDINGS

Operational Characteristics:

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 1. (Required) Provide a positive and reliable means of jettisoning, activating and retaining the one-man life raft for the overwater kit. | 1. Not applicable to cold climate kit. |
| 2. (Required) Have means to prevent or detect tampering with contents of the kit. | 2. None provided. |
| 3. (Desired) Permit operation from -65°F (minimum exposure of three days without benefit of solar radiation) to 125°F (minimum exposure of four hours with full impact of solar radiation, 360 BTU/sq ft/hr). | 3. Kit performed satisfactorily between temperatures of 44°F and -46°F, (warmest and coldest temperatures obtained). |
| 4. (Desired) Be resistant to fungus, insects, mildew, and corrosion. | 4. No deficiencies found. |
| 5. (Desired) Be designed to sustain atmospheric pressures encountered up to 30,000 feet mean sea level. | 5. Components proved satisfactory to these heights on previous test of survival kit with like components. |
| 6. (Required) Consist of two separate packages suitably bound and appropriately identified, to form a unit type survival kit for storage in Army aircraft. | 6. Not applicable to OV-1 survival kit. |
| 7. (Required) The kit may accompany occupants abandoning the aircraft in flight by having the kit packages readily separable within each type kit and capable of being attached to the occupants. | 7. Not applicable to OV-1 survival kit. |
| 8. (Desired) The exterior dimensions of the kit packages not to exceed 20x14x11 inches. | 8. Not applicable to OV-1 survival kit, however kit is smaller than the desired dimensions. |

MILITARY CHARACTERISTICSFINDINGSOperational Characteristics:

9. (Desired) the gross weight not to exceed 40 pounds.
10. (Desired) Be comprised of similar or identical components found in all kits, and supplemented by special components to conform to the cold climate, hot climate and overwater kit requirements. The cold climate kit is to contain the following components:

<u>Description</u>	<u>Qty Req</u>	<u>Qty Test Survival Kit</u>
a. Container, Assembly	1	1
b. Pouch, Container, Moistureproof	1	1
c. Compass, Lensatic	1	1
d. Fishing Kit, Survival	1	0 (one recommended)
e. Jackknife, Utility	1	1
f. Headnet, Mosquito	2	1
g. Spoon, Nonmetallic	2	1
h. FM 21-76 Survival	2	0 (one recommended)
i. Mirror, Emergency, Signal, Metal	1	1 (glass)
j. Kit, First Aid	2	2 (provided as a supplement to the survival kit).
k. Signal, Distress, Day and Night	4	2
l. Match, Roll	2	2
m. Ointment, Sun Protective, Metal Can	2	0 (one recommended)
n. Food Packet, Survival, All Purpose	14	2
o. Saw-Knife-Shovel Assembly, Detachable Handle (improved model)	1	0 (one smaller type recommended).
p. Bag, Sleeping, Vacuum Packed	2	1
q. Fuel, Ration Heating, Individual Box	2	3
r. Tabs, Fire Starting	4	0 (four recommended)
s. Containers, Drinking Water, Plastic	2	1
t. Candle, Wax, Plumbers-Type	10	2

Durability and Reliability:

11. (Desired) All components shall have a minimum service life of at least two years without replacement.
11. Unable to determine, however, all components except radio battery appear to fulfill this desired requirement.

MILITARY CHARACTERISTICS

FINDINGS

Durability and Reliability:

12. (Desired) Containers shall be constructed of material which shall have maximum practicable protection against moisture, insects, fungus, fire, gasoline and oil. Materials shall be as light as possible consistent with the capability of withstanding prolonged usage in aircraft. Fabric, if used, shall be capable of withstanding desert, temperate, tropic, and arctic temperatures without cracking or breaking when folded and unfolded. Such fabric shall be easily repairable in the field without special tools. Service life should be in consonance with service life of the back pack parachute.

12. Appears to fulfill the arctic or cold climate requirement.

Transportability:

13. (Required) Capable of being carried by an individual while he is wearing individual flight clothing and equipment, including arctic clothing and body armor and/or standard Army aviator life preserver.

13. Satisfies the arctic clothing requirement.

14. (Required) Transportable by normal land, sea, and air transport in bulk quantities with or without packaging.

14. Yes, by land w/o packaging.

15. (Required) Application of special regulations. Conform with storage requirements of subparagraph C17.1, AR 705-15, 14 October 1963.

15. Satisfies this requirement to -46°F. and to altitudes of 30,000 feet.

16. Maintenance Requirements:

- a. (Required) Kits shall have instructions and means for performing periodic visual inspections of the contents to insure completeness and serviceability of the contents.

- a. None provided.

- b. (Desired) Standard type components shall be used to the maximum extent possible.

- b. Appears to satisfy this requirement.

*It should be noted that the military characteristics, paragraph E, Annex A were drafted and approved for a two package survival kit, for two men, and of a size and weight much larger than the OV-1 seat can accommodate. Due to the decreased size and limited space available in the test survival kit, there are some differences in the quantities of some of the components that have been provided. However, since space and weight were available, each item required by the military characteristics should be included in the test survival kit.

Part IV - Distribution

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AD

ACCESSION NO

United States Army Arctic Test Center, Fort Greely, Alaska
SERVICE TEST OF THE SURVIVAL KIT, OV-1 AIRCRAFT, COLD
CLIMATE. Final Report 28 April 1964. RDT&E Project No
1-K-1-41812-D-183-19.

Unclassified Report. Tests were conducted to determine the suitability of the Survival Kit, OV-1 Aircraft, Cold Climate for Army use under arctic winter conditions. The Survival Kit was tested at ambient air temperatures ranging from 44°F. to -46°F. The URC-10 radio w/battery was unsatisfactory on the VOICE mode after a cold-soak of 16 hours at temperatures of 14°F. and below. It was concluded that, when modified to correct the deficiencies and shortcomings, and when the URC-10 radio is removed from the kit, to be carried as personal equipment, the Survival Kit, OV-1 Aircraft, Cold Climate should be suitable for use under arctic winter conditions.

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